## Sonic Boom Community Response Metric & Methodology



Completed Technology Project (2013 - 2020)

#### **Project Introduction**

Sonic Boom Community Response Metric & Methodology validates field study methodology, including indoor and outdoor noise metrics, exposure estimates, survey tools, and test protocols to support community studies with a low-boom flight demonstration aircraft.

#### **Anticipated Benefits**

This technical challenge addresses preparing tools and processes for measuring community response during future overflight campaigns by a low-boom supersonic demonstrator. These technologies are key, as the data collected during the overflight campaigns will become a body of knowledge on community response to low-noise sonic booms that, upon transfer to regulators, could support a new noise standard for commercial supersonic flight over land. Such sonic boom levels achieved through new aircraft design would be dramatically quieter than those produced by the retired Concorde or by current military aircraft. The preparation for demonstration of low boom overland flight. The ultimate goal of such a demonstration will be to develop a body of knowledge on community response to low noise sonic boom that would support the development of a noise standard for supersonic cruise noise. The sonic boom noise levels that may be achieved in future designs are dramatically quieter than those produced by aircraft such as the Concorde or current military aircraft.

#### **Primary U.S. Work Locations and Key Partners**





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#### **Advanced Air Vehicles**

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Organizations Performing Work	Role	Туре	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Applied Physical Sciences Corporation	Supporting Organization	Industry	
• Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California
Fidell Associates, Inc	Supporting Organization	Industry	
Wyle Laboratories, Inc.	Supporting Organization	Industry	

Primary U.S. Work Locations	
California	Virginia

### **Project Transitions**



October 2013: Project Start

## Organizational Responsibility

## Responsible Mission Directorate:

Aeronautics Research Mission Directorate (ARMD)

#### **Lead Center / Facility:**

Langley Research Center (LaRC)

#### **Responsible Program:**

Advanced Air Vehicles

## **Project Management**

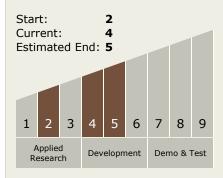
#### **Program Director:**

James A Kenyon

#### **Project Managers:**

Peter G Coen Lori P Ozoroski

# Technology Maturity (TRL)



## **Technology Areas**

#### Primary:

Continued on following page.



#### **Advanced Air Vehicles**

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#### September 2020: Closed out

Closeout Summary: The SBCR TC completion is the culmination of 7 years of work developing, testing and validating many aspects of the field methodologies for sonic boom community response. Four areas of work were completed as part of this Technical Challenge Milestone. Models for predicting the structural acoust ic impacts of sonic booms were developed and verified. Models of human respon se to sonic boom noise indoors and outdoors were developed and evaluated in a meta-analysis of several tests conducted over the period. Sonic boom propagati on techniques and the effects of the atmosphere on sonic booms were studied a nd models developed to quantify those impacts. And finally, a draft test plan of survey tools and protocols was written based on experience with risk reduction s tudies for community response testing. All of these accomplishments will suppor t the future community test planning and execution of over flight tests using the X-59 aircraft in support of the critical commitment to provide a database of com munity response to low sonic booms to the international community in support o f developing enroute noise standards for supersonic aircraft. The SBCR TC compl etion is the culmination of 7 years of work developing, testing and validating ma ny aspects of the field methodologies for sonic boom community response. Four areas of work were completed as part of this Technical Challenge Milestone. Mod els for predicting the structural acoustic impacts of sonic booms were developed and verified. Models of human response to sonic boom noise indoors and outdoo rs were developed and evaluated in a meta-analysis of several tests conducted o ver the period. Sonic boom propagation techniques and the effects of the atmos phere on sonic booms were studied and models developed to quantify those imp acts. And finally, a draft test plan of survey tools and protocols was written base d on experience with risk reduction studies for community response testing. All of these accomplishments will support the future community test planning and e xecution of over flight tests using the X-59 aircraft in support of the critical com mitment to provide a database of community response to low sonic booms to th e international community in support of developing enroute noise standards for supersonic aircraft.

#### **Project Website:**

https://www.nasa.gov/aeroresearch/programs/aavp/cst

## Technology Areas (cont.)

TX15 Flight Vehicle Systems
 □ TX15.1 Aerosciences
 □ TX15.1.4 Aeroacoustics

## Target Destination Earth

